A Level Biology

Summer Work 2026-2027

Sandringham School

Everybody can be Somebody

Summer Work

1 Using this booklet

Watch	Using the QR code or link, watch the video and make detailed notes
Create	Create a resource e.g. flash cards or a mind map
Practice	Complete the attached practice questions
★★☆ Review	Mark your practice questions using the mark scheme at the back of the booklet
Check	Follow the link to an online quiz, be honest with your scores!

2 Summer to do list

Purchase appropriate laptop		
Purchase lever arch folder and dividers e.g. https://www.wilko.com/en-uk/wilko-a4-pink-lever-arch-file/p/0131460		
Purchase lab coat e.g. https://www.workinstyle.com/howie-lab-coat-eehwc/2535279/p Ensure tight cuffs for microbiology work,(these can also be embroidered if you'd like – if you get your initials/surname this prevents confusion!) If you are an A level chemist you can also use this labcoat.		
Purchase practical revision guide https://www.hoddereducation.co.uk/subjects/science/products/16-18/aqa-a-level-biology-student-guide-practical-biolog		
Print specification https://filestore.aqa.org.uk/resources/biology/specifications/AQA-7401-7402-SP-2015.PDF		

A Level Biology Content

You will be following the AQA A Level Biology course (7402).

https://www.aqa.org.uk/subjects/science/as-and-a-level/biology-7401-7402

Year 12

1. Biological molecules
2. Cells
3. Organisms exchange substances with their environment
4. Genetic information, variation and relationships between organisms

Year 13

5. Energy transfers in and between organisms
6. Organisms respond to changes in their internal and external environments
7. Genetics, populations, evolution and ecosystems
8. The control of gene expression

Assessment structure

You will sit three papers at the end of year 13.

Paper 1	Paper 2	Paper 3
Topics 1-4	*Topics 5-8*	*Topics 1-8*
2 hours 91 marks 35% of A Level	2 hours 91 marks 35% of A Level	2 hours 78 marks 30% of A Level
Relevant practical skills may be assessed in all three papers		

Required Practicals

You will complete 12 **required practicals** across years 12 and 13.

You will be required to keep a lab book, which will form part of the evidence for the Practical assessment. You will be awarded a pass or fail for your practical work, which will appear as a separate grade when you receive your A-level results.

15% of the questions on the final written exam papers will also be about practical work!

Biology Field Course -TBC

In the summer term 2027 we hope to be doing a 3 day residential trip to Osmington Bay, Dorset.

You will complete Required Practical 12 on this trip and will collect results to use in your analysis and statistical testing.

More details later in the year!

iii *Engage in wider reading*

Cells Alive

University of Oxford Biology Department youtube page

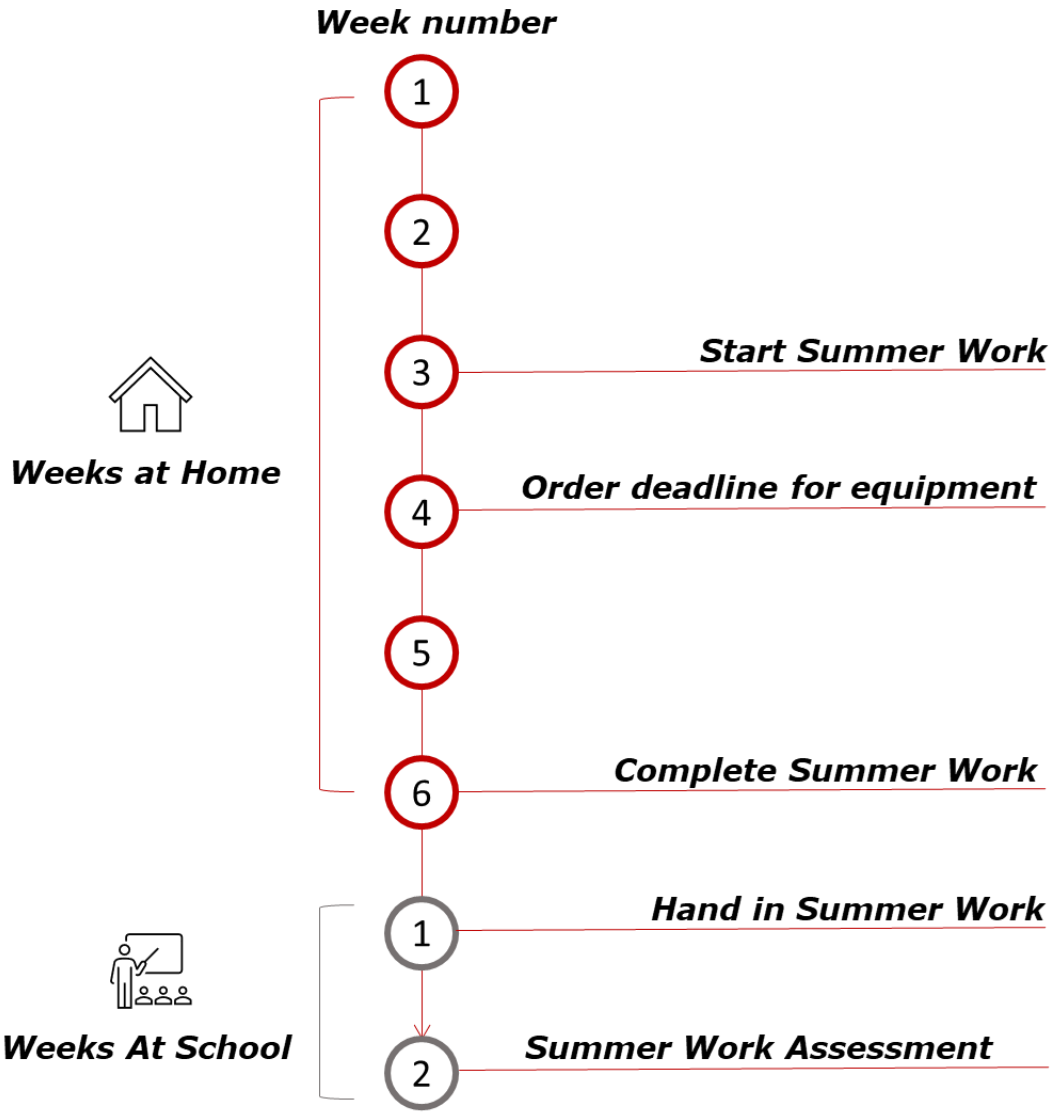
A Day in the life of an undergraduate biology student

TED Talks on Biology

ScienceDaily – current research articles

New Scientist – current research articles

iv *Recommended Summer plan*



v *What to bring on the first day*

- Folder with Dividers
- Printed Specification
- Lab Coat
- Laptop
- Completed summer work
- Revision notes / flashcards

FAQs

I studied combined science at GCSE, how can I start A level as strongly as possible?

Most of this summer work is aimed at ensuring that everybody has the correct foundational knowledge in September. The main differences between triple and combined biology are found in homeostasis, so try to learn those triple modules before arriving in September. The following book is also quite useful to help you get prepared;
https://www.amazon.co.uk/Head-Start-level-Biology-Level/dp/1782942793/ref=sr_1_9?crid=258B5G7BXL8X0&keywords=a+level+biology&qid=1684504535&sprefix=a+level+biology%2Caps%2C106&sr=8-9

I want to become a medic or vet, what do I need to do to increase my chances of this?

Firstly, for many of these courses you are required to get an A or A* at Biology, so ensuring you come with a strong biological background is very important. Once you have done this, you should pursue further reading and work experience opportunities as soon as possible and discuss future plans with the school careers guidance team.

I am having trouble accessing part of my summer work, what can I do?

Email Mrs Simmonds at
simmondss@mysandstorm.org

Practical skills – key terms

Join the boxes to link the keyword to the definition.

Key term		Definition
Accurate		A statement suggesting what may happen in the future.
Data		An experiment that gives the same results when a different person carries it out, or a different set of equipment or technique is used.
Precise		A measurement that is close to the true value.
Prediction		An experiment that gives the same results when the same experimenter uses the same method and equipment.
Range		Physical, chemical or biological quantities or characteristics.
Repeatable		A variable that is kept constant during an experiment.
Reproducible		A variable that is measured as the outcome of an experiment.
Resolution		This is the smallest change in the quantity being measured (input) of a measuring instrument that gives a perceptible change in the reading.
Uncertainty		The interval within the true value that can be expected to lie.
Variable		The spread of data, showing the maximum and minimum values of the data.
Control variable		Measurements where repeated measurements show very little spread.
Dependent variable		Information, in any form, that has been collected.

Biological molecules

Watch

https://www.youtube.com/watch?v=FgfknBZaVTI

Biochemical tests

Practice

Research the four biochemical tests and write a method for each.

Food tested for.	Method	Positive result
Simple sugars		
Starch		
Protein		
Lipids (fats)		

★★☆

Review

Get a blank piece of A4 paper and write out everything you can remember about these tests on to it. Then use the table above to fill in the things you forgot!

Check

Log on to the Quiz below and attempt the questions

https://docs.google.com/forms/d/e/1FAIpQLSfSHgqabQX5lrE5yMg4w1xZy9ZdmFSY4mvZyUx1i_GnmQDnTw/viewform?usp=sf_link

Score: / 10

Cells

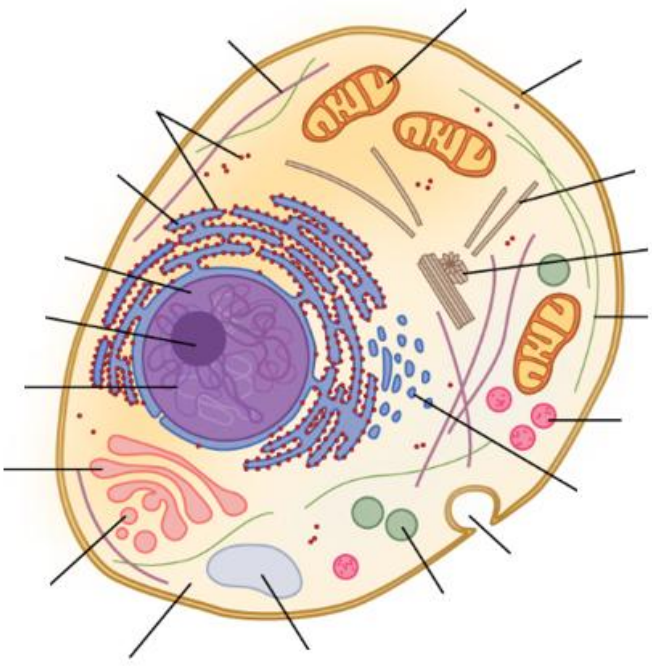
Watch

https://www.youtube.com/watch?v=mUJryLNKScg

Practice

Label the diagram of the animal cell below.

You only need to write the name of each organelle.



Cells

Practice

Complete the table to describe the functions of each organelle in a eukaryotic cell.

Nucleus	
Nucleolus	
Mitochondria	
Chloroplasts	
Rough Endoplasmic Reticulum (RER)	
Smooth Endoplasmic Reticulum (SER)	
Golgi Apparatus	
Lysosomes	
Ribosomes	
Cell wall	
Vacuole	

★★☆

Review

Complete the Quizlet.

Change 'answer with' to 'definition', then click the blue 'Start test' button at the bottom right.

https://quizlet.com/804105807/test

Score: / 16

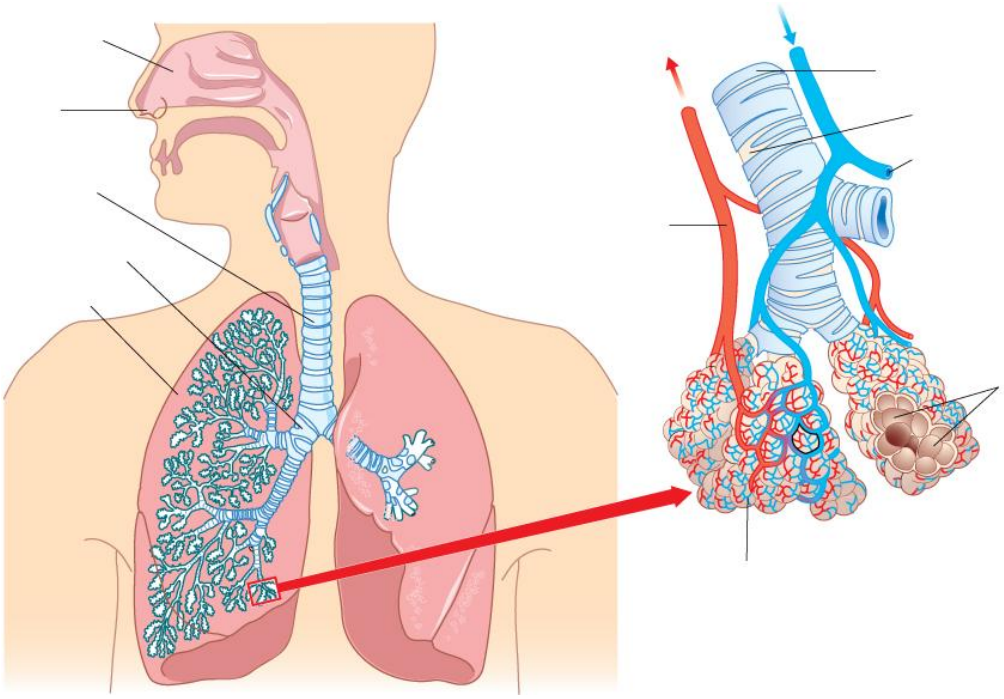
Exchange of substances

Watch

https://www.youtube.com/watch?v=v_j-LD2YEqg

Practice

Label the diagram of the respiratory system.



Exchange of substances

Practice

Where is the cartilage found (in the respiratory system) and what is its purpose?

Name three adaptations of the alveoli and how this increases the efficiency of gas exchange.

1.

2.

3.

Describe the role of the intercostal muscles and diaphragm in the mechanism of breathing.

Genetic Information

Watch

https://www.youtube.com/watch?v=ndrN_W1snmg

Create

Create flashcards using the video and link given below.

Flashcard 1 – Nucleotide structure (labelled diagram)
Names of four bases and pairing
Bonds formed between bases
How many bonds formed between pairs

Flashcard 2 – Formation of the polynucleotide polymer
Description of bonds formed between nucleotides
Description of type of reaction

Flashcard 3 – Structure and functions of DNA molecule

https://www.chemguide.co.uk/organicprops/aminoacids/dna1.html

Check

Complete the quiz and record your score below.

https://docs.google.com/forms/d/e/1FAIpQLSepDuX1AAFB99MEi1jSqpbnycvOU-fZEOhezzdXs51-glHLCg/viewform?usp=sf_link

Score: / 12

Maths skills

1 Converting units

Watch

https://www.youtube.com/watch?v=rJJrR8h-DtA

Practice

Multiplication factor	Prefix	Symbol
10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{-2}	centi	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n

Convert the following units.

1. 10mm to μm _____
2. 67mm to μm _____
3. 33 μm to mm _____
4. 9.2 μm to mm _____
5. 1.2 nm to μm _____
6. 0.3 μm to nm _____
7. 4km to mm _____
8. 0.8km to mm _____
9. 0.65cm to mm _____
10. 2.64μm to mm _____
11. 1.2cm to mm _____
12. 98.8mm to μm _____
13. 312μm to mm _____
14. 13.1cm to μm _____
15. 68.9cm to μm _____
16. 0.05m to μm _____

★★☆

Review

Turn to the back of the booklet and mark your answers

Score: / 16

Maths skills

2 Standard form

Watch

https://www.youtube.com/watch?v=H3ewmorcYjU

Practice

Convert the following from standard form into regular numbers.

1. 1.8×10^{4} _____
2. 3.3×10^{6} _____
3. 9.1×10^{-3} _____
4. 6.5×10^{-2} _____
5. 1.04×10^{3} _____
6. 2.96×10^{-5} _____
7. 8.01×10^{-7} _____
8. 1.32×10^{-3} _____

Convert the following numbers into standard form.

1. 218000 _____
2. 0.000043 _____
3. 1800 _____
4. 0.0019 _____
5. 188.9 _____
6. 0.000062 _____

★★☆

Review

Turn to the back of the booklet and mark your answers

Score: / 14

Maths skills

③ Calculating percentages

To work out a percentage, you must identify or calculate the total number using the equation:

$$\text{Percentage} = \frac{\text{number you want as a percentage of total number}}{\text{total number}} \times 100$$

For example, in a population, the number of people who have brown hair was counted.
The results showed that in the total population of 4600 people, 1800 had brown hair.
The percentage of people with brown hair is found by calculating:

$$\frac{\text{Number of people with brown hair}}{\text{Total number of people}} \times 100$$

$$= \frac{1800}{4600} \times 100 \qquad = 39.1\%$$

Practice

1. The table below shows some data about energy absorbed by a tree in a year and how some of it is transferred.

Energy absorbed by the tree in a year	3 600 000 kJ/m^2
Energy transferred to primary consumers	2240 kJ/m^2
Energy transferred to secondary consumers	480 kJ/m^2

Calculate the percentage of energy absorbed by the tree that is transferred to

a) Primary consumers
b) Secondary consumers

Maths skills

④ Calculating percentage change

When you work out an increase or decrease as a percentage change, you must identify, or calculate, the total original amount:

$$\% \text{ increase} = \frac{\text{Increase}}{\text{Original amount}} \times 100$$

$$\% \text{ decrease} = \frac{\text{Decrease}}{\text{Original amount}} \times 100$$

Practice

Sucrose conc./mol dm^{-3}	Initial mass / g	Final mass / g	Mass change / g	Percentage change in mass
0.9	1.79	1.06		
0.7	1.86	1.30		
0.5	1.95	1.70		
0.3	1.63	1.76		
0.1	1.82	2.55		

★★☆

Review

Turn to the back of the booklet and mark your answers

Score: / 14

Answers

1 Converting units

Convert the following units.

1. 10mm to µm 10,000 µm
2. 67mm to µm 67,000 µm
3. 33 µm to mm 0.033 mm
4. 9.2 µm to mm 0.0092 mm
5. 1.2 nm to µm 0.0012 µm
6. 0.3 µm to nm 300 nm
7. 4km to mm 4,000,000 mm
8. 0.8km to mm 800,000 mm
9. 0.65cm to mm 6.5 mm
10. 2.64 µm to mm 0.00264 mm
11. 1.2cm to mm 12 mm
12. 98.8mm to µm 98,800 µm
13. 312µm to mm 0.312 mm
14. 13.1cm to µm 131,000 µm
15. 68.9cm to µm 689,000 µm
16. 0.05m to µm 50,000 µm

2 Standard form

Convert the following from standard form into regular numbers.

1. 1.8×10^{4} 18,000
2. 3.3×10^{6} 3,300,000
3. 9.1×10^{-3} 0.0091
4. 6.5×10^{-2} 0.065
5. 1.04×10^{3} 1040
6. 2.96×10^{-5} 0.0000296
7. 8.01×10^{-7} 0.000000801
8. 1.32×10^{-3} 0.00132

Convert the following numbers into standard form.

1. 218000 2.18×10^{5}
2. 0.000043 4.3×10^{-5}
3. 1800 1.8×10^{3}
4. 0.0019 1.9×10^{-3}
5. 188.9 1.889×10^{-2}
6. 0.000062 6.2×10^{-5}

3 Calculating percentage

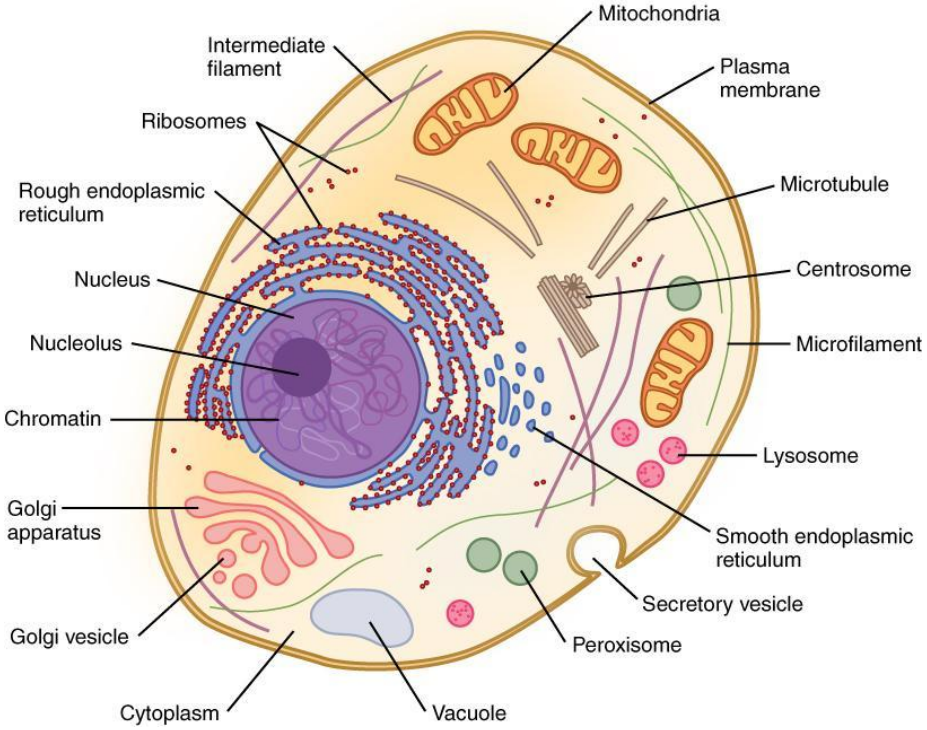
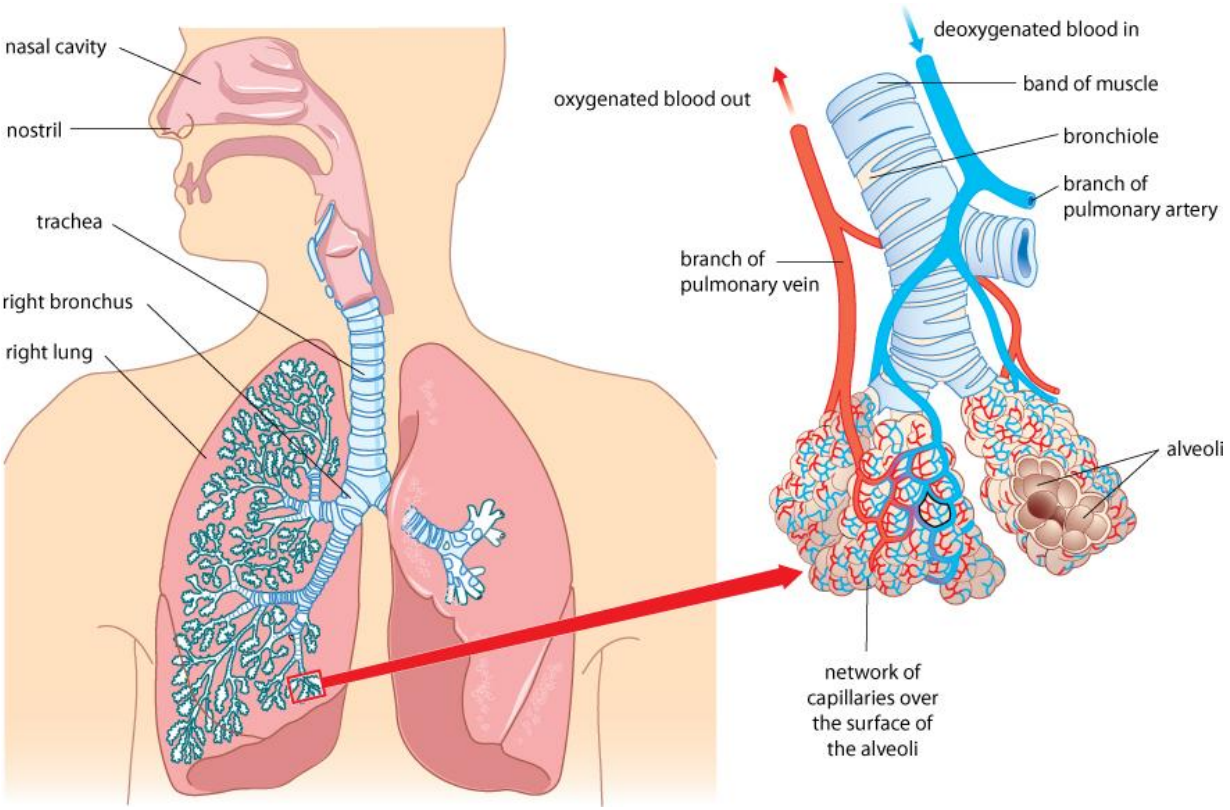
a) 0.06% b) 0.013%

4 Calculating percentage change

Sucrose conc./mol dm^{-3}	Initial mass / g	Final mass / g	Mass change / g	Percentage change in mass
0.9	1.79	1.06	-0.73	-40.8%
0.7	1.86	1.30	-0.56	-30.1%
0.5	1.95	1.70	-0.25	-12.8%
0.3	1.63	1.76	+0.13	+8.0%
0.1	1.82	2.55	+0.73	+40.1%

Answers

Cells



Exchange of substances